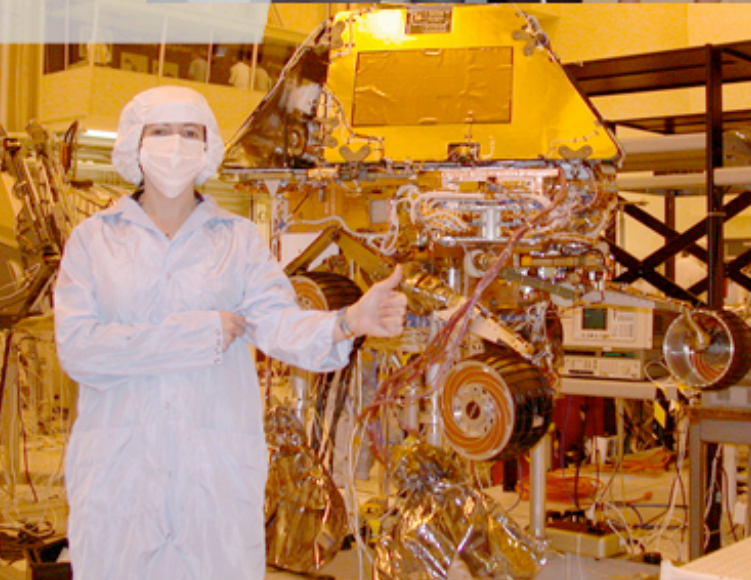
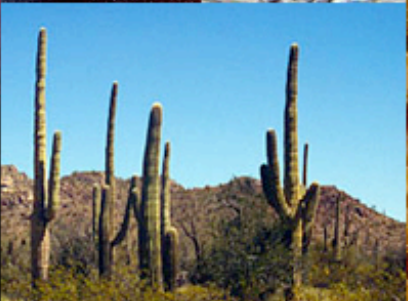
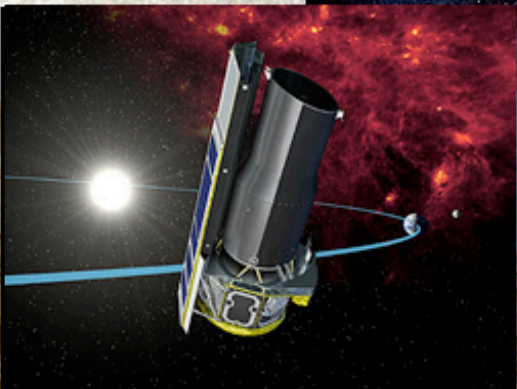
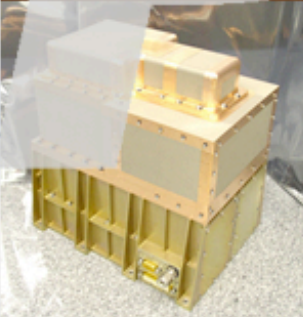
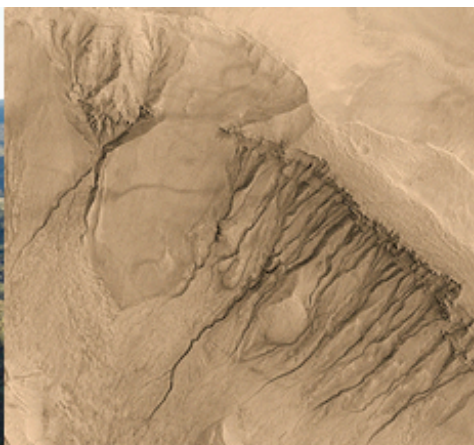


# Preserving Our Intellectual Capital: An Institutional Perspective



Mark V. Sykes,  
CEO and Director  
Planetary Science Institute







# PSI is involved in a number of NASA and other missions

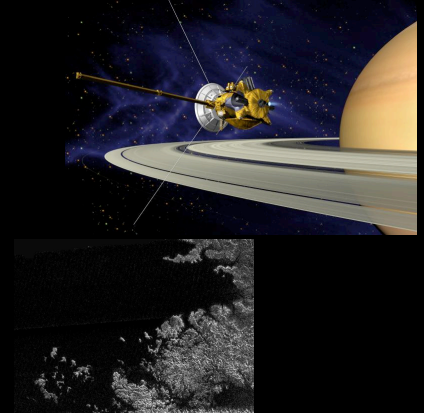
Mercury MESSENGER



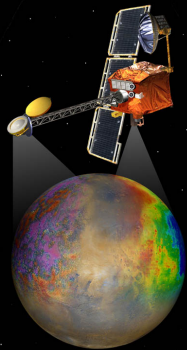
Dawn



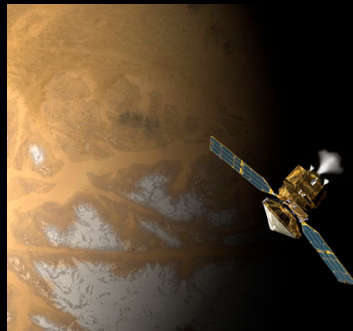
Cassini



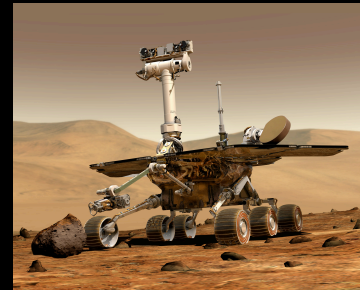
Mars Odyssey



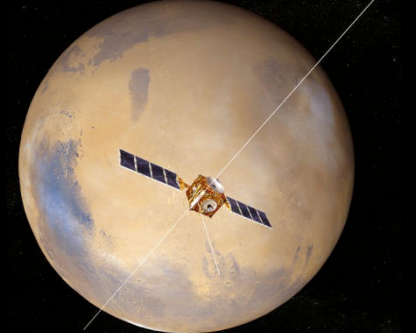
Mars Reconnaissance Orbiter



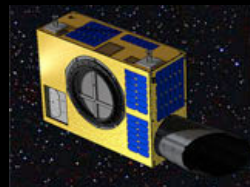
Mars Exploration Rovers



Mars Express (ESA)



Hayabusa (Japan)

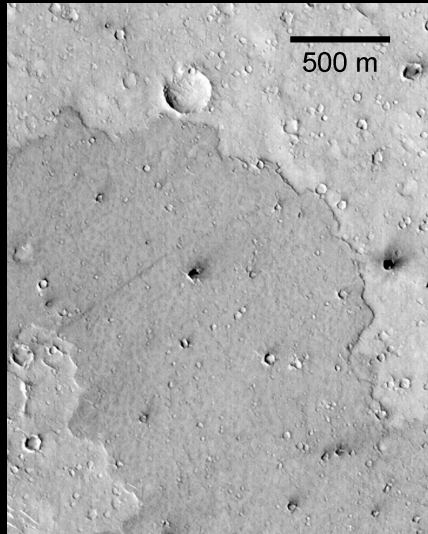


NEO Surveillance  
and Tracking (Canada)

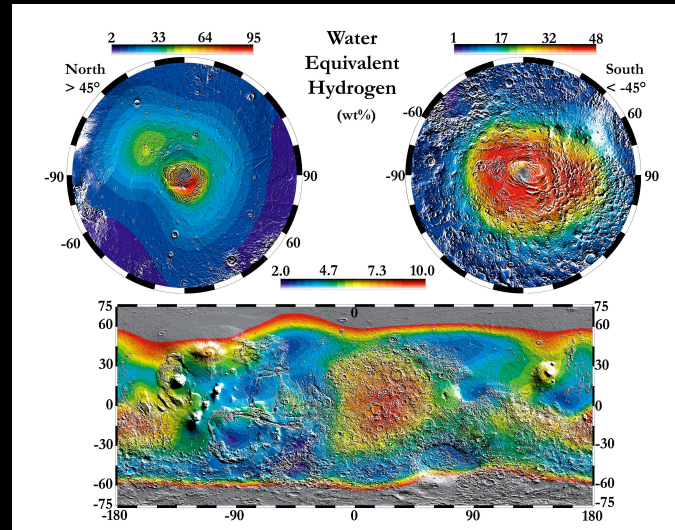


Chandrayaan-1 (India)

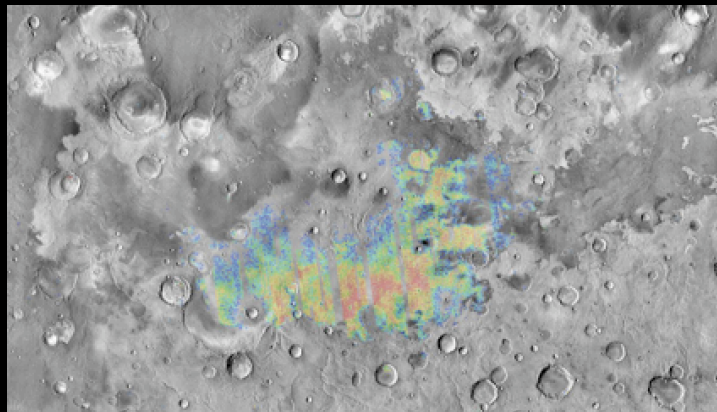
# 40% of the work at PSI involves Mars



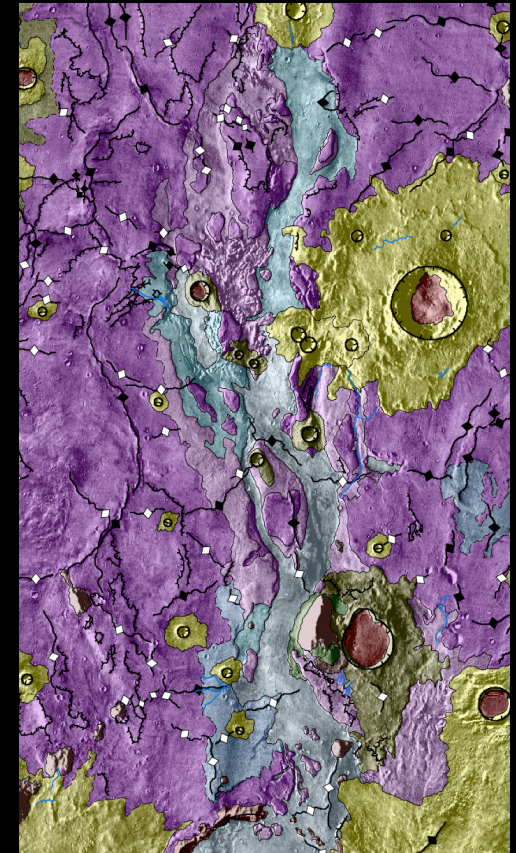
Reconstructing the history of the Martian surface using crater counts. (Hartmann)



Mapping out subsurface water ice. (Feldman)



Hematite mapping of Meridani Planum helped select the landing site for the MER *Opportunity* rover. (Lane)



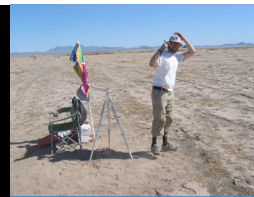
Geologic mapping to understand ancient Martian outflow channels. (Mest)



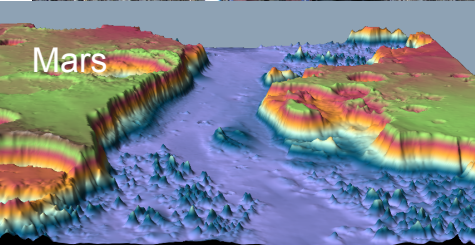
# PSI scientists travel the world studying sites analogous to Mars



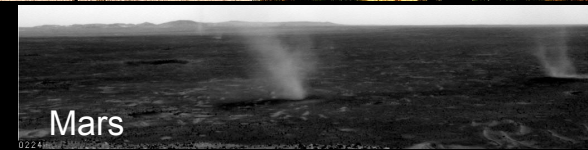
Alexis Rodriguez studying volcanic mudflows in Indonesia



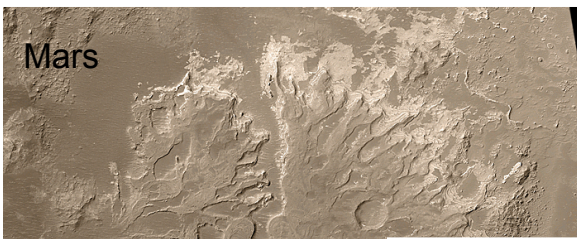
Matt Balme studying dust devils in Arizona and Nevada to understand dust devils on Mars



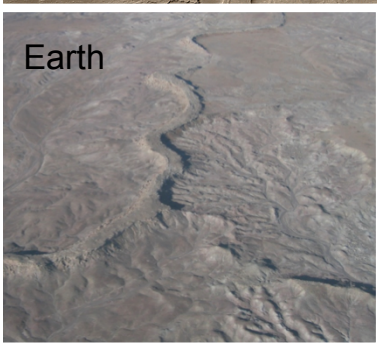
Java



Mars



Mars



Earth



Becky Williams studies fossilized rivers in Utah - similar to those seen on Mars

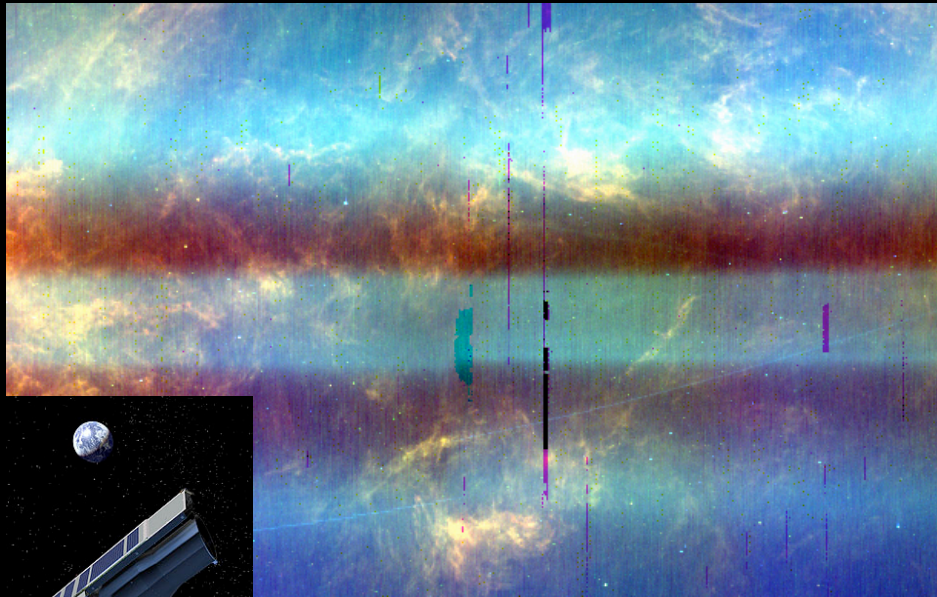
Aileen Yingst studies glacier-volcano interactions in Iceland



Mary Bourke in the Australian Outback in front of the oldest river on Earth - 350 Myr - to understand water flow in hyperarid conditions



# PSI scientists use ground-based and space-based telescopes to study asteroids and comets



Spitzer

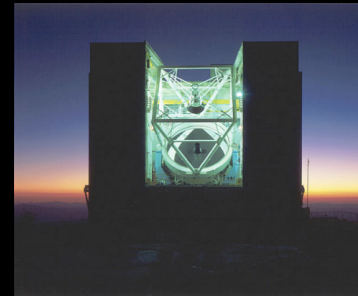
Ceres



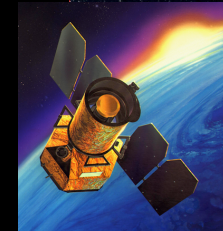
Submillimeter Telescope,  
Mount Graham



Mayall Telescope,  
Kitt Peak



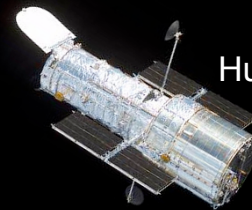
MMTO, Mt. Hopkins



GALEX



McMath Telescope,  
Kitt Peak



Hubble

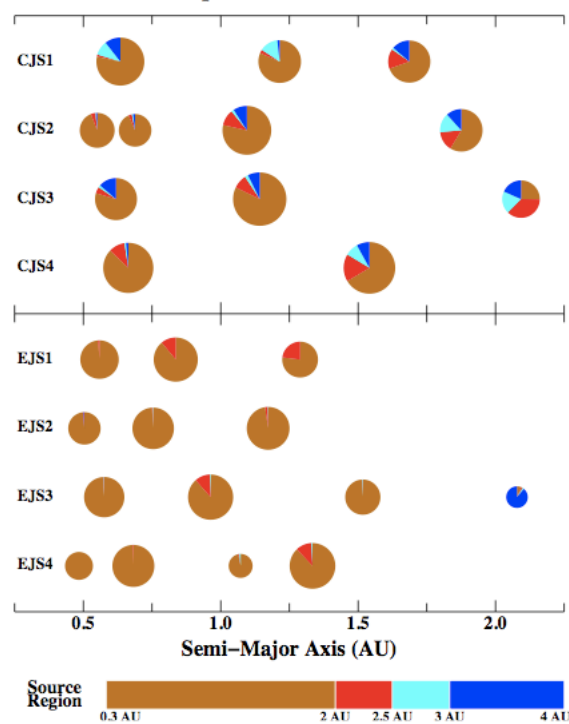


Paul Abell  
IRTF,  
Hawaii

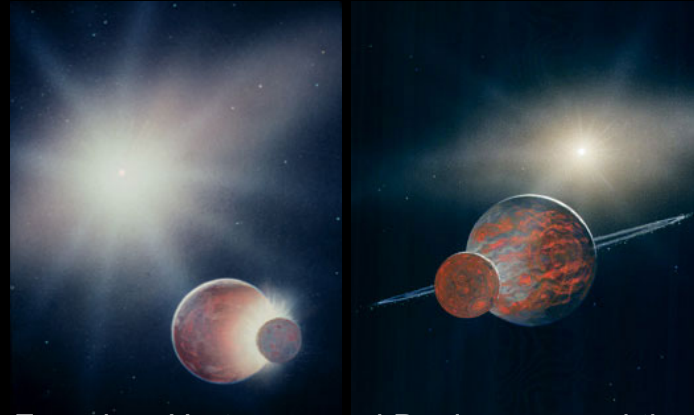


# PSI scientists model how our solar system and other solar systems formed and evolved

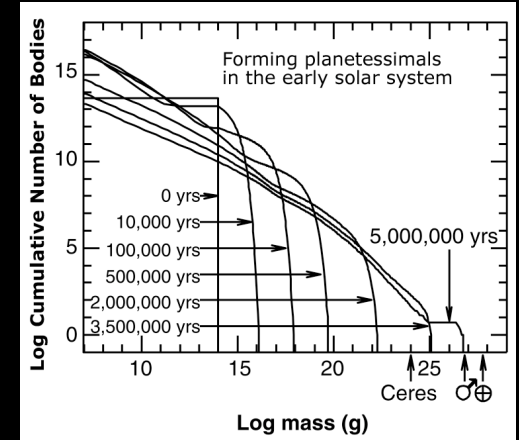
Location and Composition of Final Terrestrial Planets



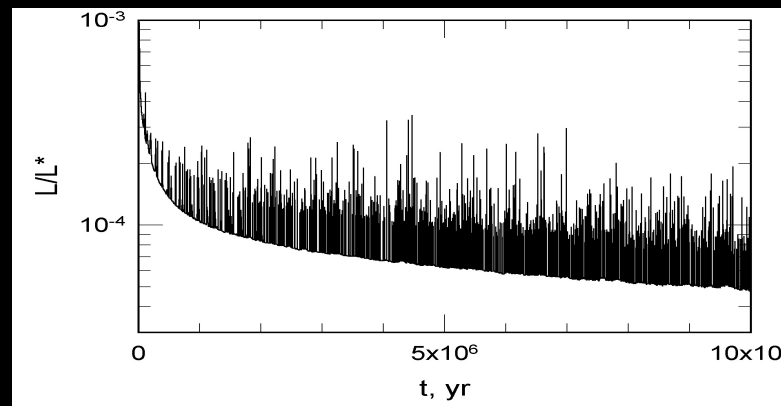
Simulations of inner solar system planet formation indicate Earth's ocean may have come from outer-main belt asteroids. (O'Brien)



Founders Hartmann and Davis proposed the modern theory of the origin of the Moon from the giant impact of the Earth by a Mars-sized body.



(Kortenkamp)



Brightness evolution of a massive "Asteroid Belt" in another solar system with spikes due to dust from large impacts. (Weidenschilling)

... and much  
much more  
funded work



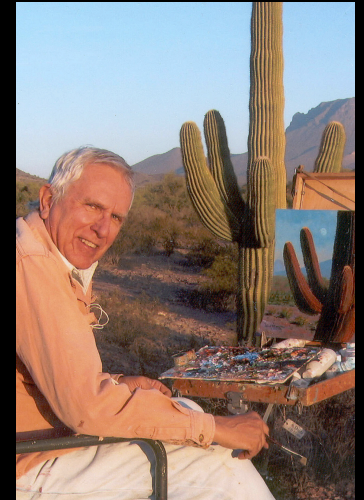
# Education and Public Outreach is a PSI Activity with a Long History



Several PSI scientists are authors of popular science books, children's books and novels.



Lebofsky teaches about planets at a DPS conference.



Hartmann, whose art conveys a scientific perspective



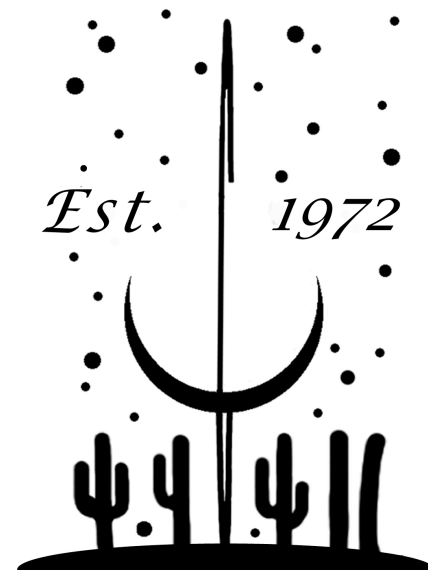
Public and broadcast events - Sykes vs. Tyson at the Great Planet Debate



TV interviews - Pierazzo interviewed by National Geographic at Meteor Crater



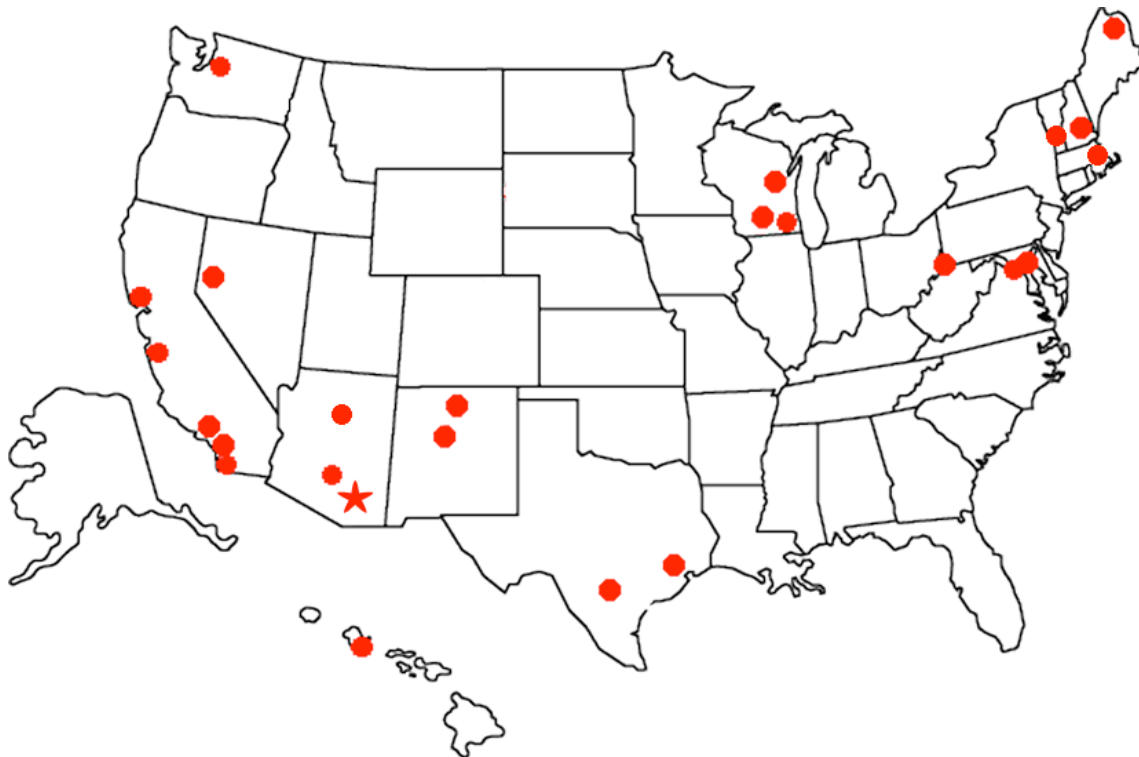
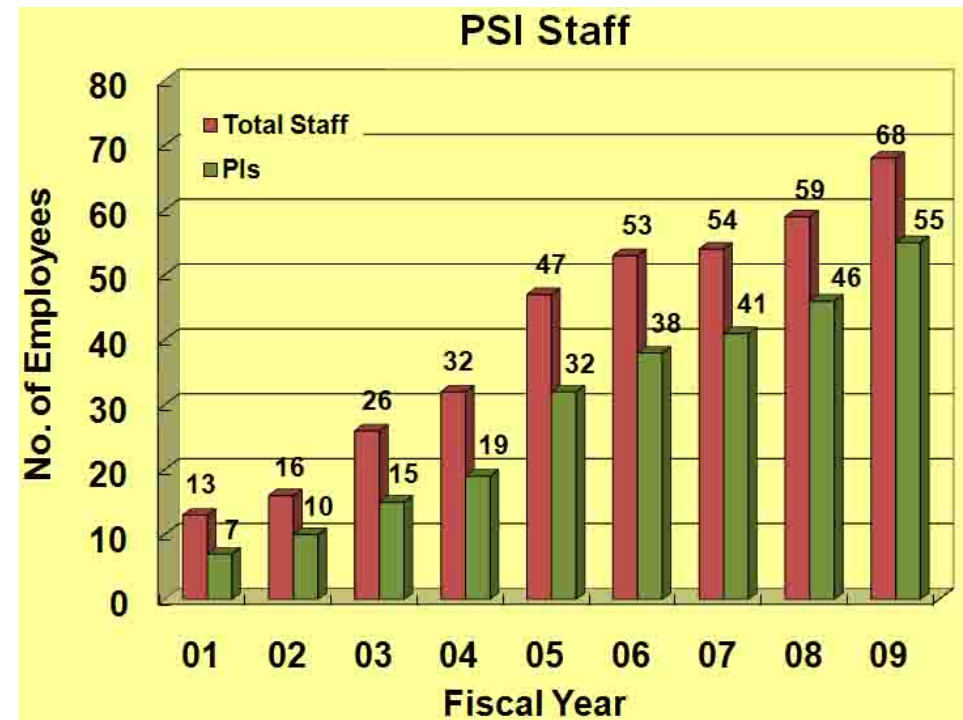




The Planetary Science Institute was founded in 1972 in Tucson, Arizona by a small group of young scientists wanting to pursue their own interests in solar system exploration.



In recent years, PSI has grown substantially and transformed into a broader-based corporate entity, supporting scientists both in Tucson and other parts of the country (and world).



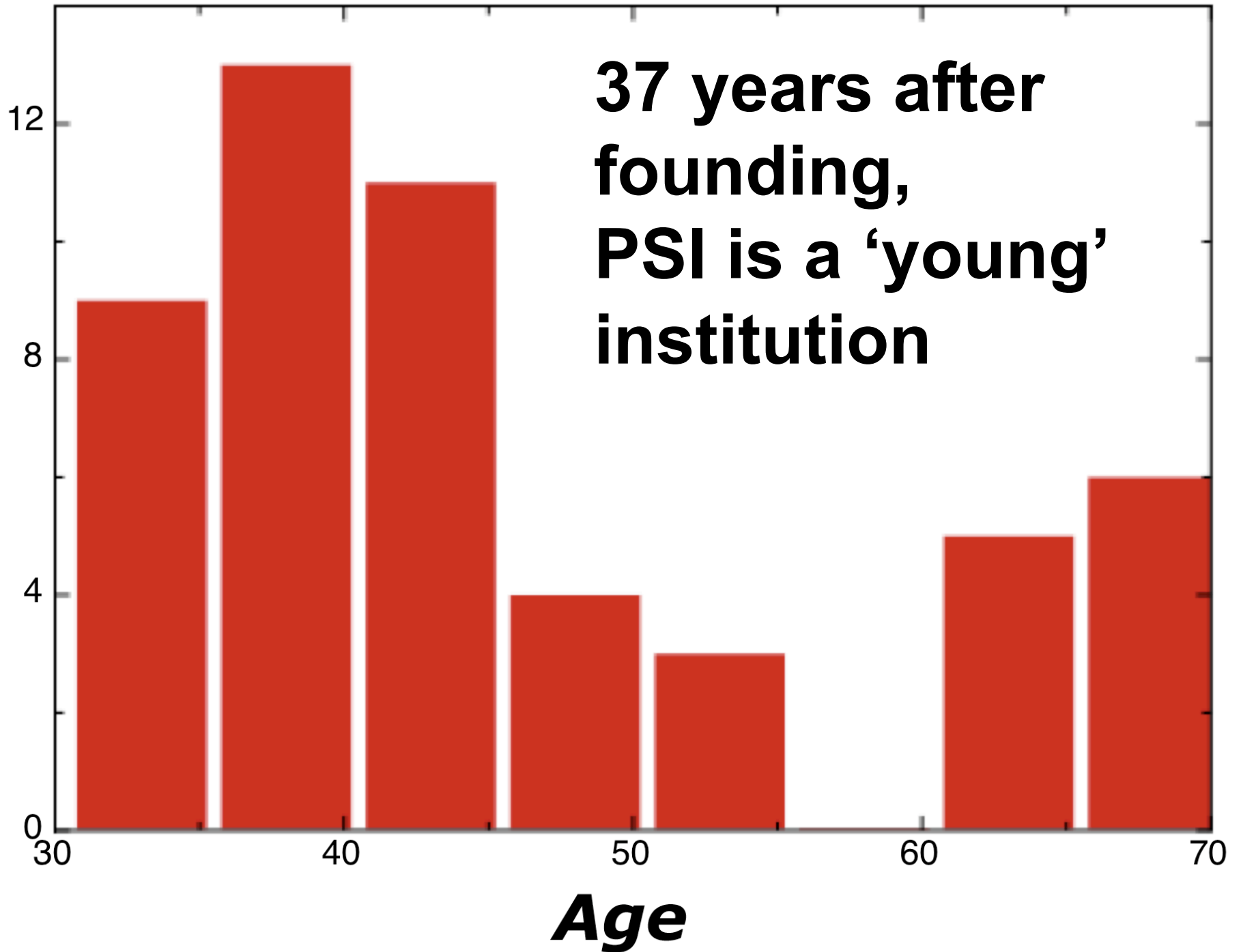
+ United Kingdom  
France  
Switzerland  
Russia  
Australia

Motivation: promote long term corporate stability and bring in younger PIs.



***Number of Scientists***

**37 years after  
founding,  
PSI is a 'young'  
institution**





## More PSI Demographics

Senior Scientists:	28 (M 16, F 12)
Research Scientists:	12 (M 10, F 2)
Assoc. Res. Scientists:	12 (M 7, F 5)
Postdocs:	1 (F 1)
Science Support (PhD):	2 (M 1, F 1)



**Growth has been primarily in 'off-site' personnel.**

Three primary categories for being off-site:

- (1) Proximity to facilities/collaborators: M(10), F(2)
- (2) Proximity to family: M(7), F(3)
- (3) Spouse relocation: M(3), F(5)

**Primary Institutional Challenge:**

Maintain a sense of community and corporate identity and a supportive environment for doing research.



## **How can people be lost to our profession?**

- (1) Retirement, limiting institutional support
- (2) Two-body problem
- (3) Family demands
- (4) Medical problems
- (5) Isolation
- (6) Loss of funding

# **Mitigation strategies to preserve our intellectual capital**

(1) Allowing scientists to work remotely  
(facilitated by the internet)

- retirement issues
- two-body problem
- live near relatives to support child care and family ties

(2) Benefit eligibility (medical, retirement, other insurance) triggers at less than full-time, and administrative flexibility in its determination.

- part-time work
- family demands
- medical problems (also FMLA, STD/LTD)



# **Intellectual capital needs community to flourish - how do you accomplish that with a distributed population of scientists?**

- (1) Create opportunities to bring people together
  - Annual Retreats
  - Supporting additional travel to Tucson by PIs
  - Dinners/Lunches at conferences/workshops
- (2) Create opportunities to interact
  - Monthly staff meetings (F2F/telecon)
  - Seminars (F2F/telecon)
  - Proposal strategy meetings
  - Red Team proposal review process
- (3) Invest in telecommunications infrastructure
  - Audio upgrades
  - Videocon/Webcasting next...
- (4) The little things
  - Branded products
  - Newsletter

**PSI Perspective: An egalitarian workplace is important  
- it allows scientists to focus on science and not  
politics/status issues**

- (1) Soft-money positions provide sufficient ongoing assessment of work quality - if you are not productive and do not write successful proposals, you are done.
- (2) People join PSI through an application process that involves approval by the science staff.
- (3) Promotions are based on years in the profession, not status in the community.
- (4) Everyone has the same access to administration and the same voice within the Institute. No special treatment.
- (5) No sense of competition within the Institute - It is expected that everyone helps everyone else out.



# Final

- We invest a lot in the training of PhDs in our profession. These are talented people.
- People tend to leave the profession not because they can't hack it, but generally for other (often family related) reasons.
- It is in our interest as a profession to do what we can to retain these valuable individuals.
- It should not be overly burdensome for institutions to be more aware of individual situations, flexible and mutually supportive.